Learning Objectives

- Define acute vs. chronic diarrhea etiologies
- Create a differential diagnosis for each type of diarrhea
- Differentiate when further testing, including a colonoscopy, should be ordered
- Discuss treatment options including symptom management

DIARRHEA

- having 3 or more loose or liquid stools per day, or as having more stools than is normal for that person.(WHO)
- Increase in frequency, fluidity or amount
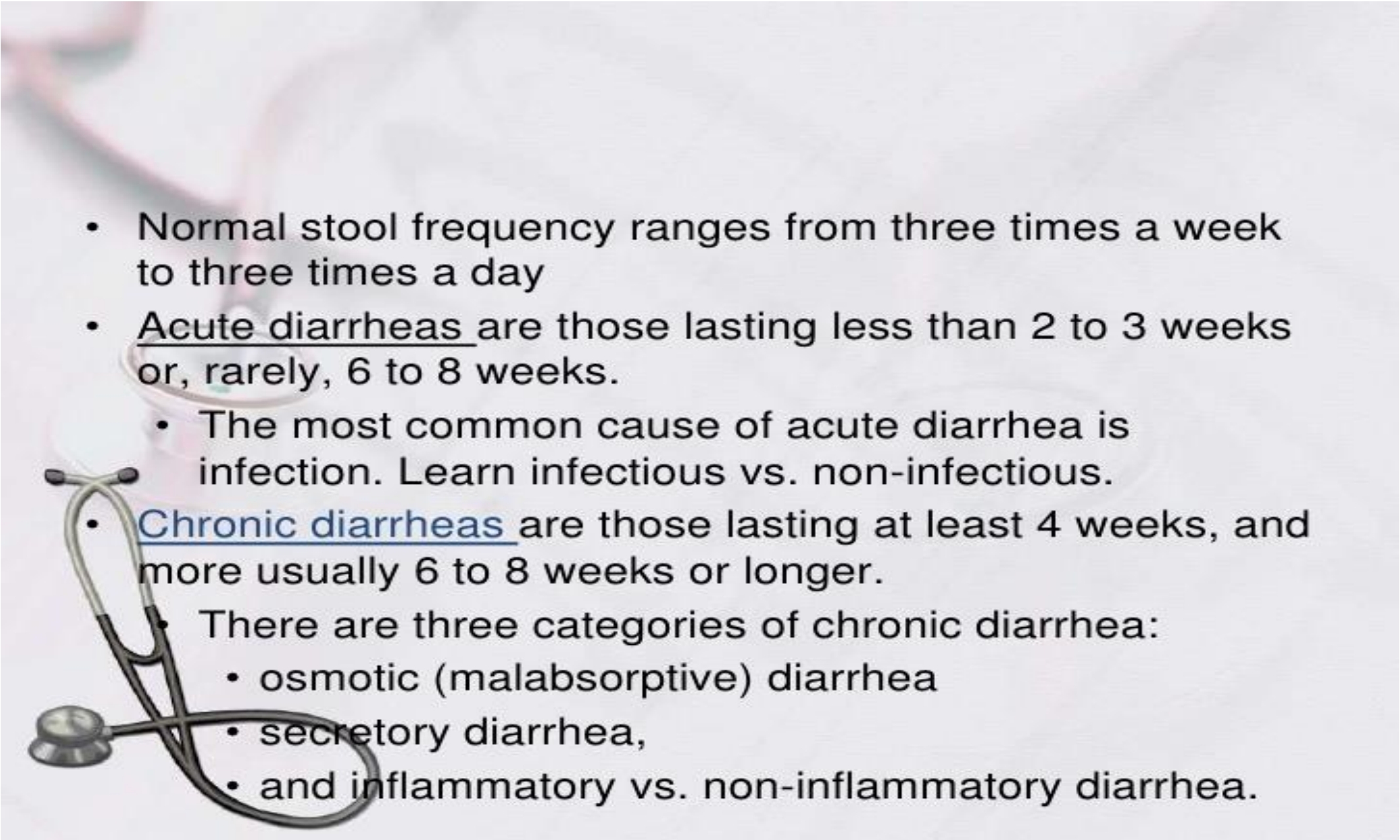- Increase in daily stool weight above 200gm

N.B

Acute lasts less than 7 - 14 days
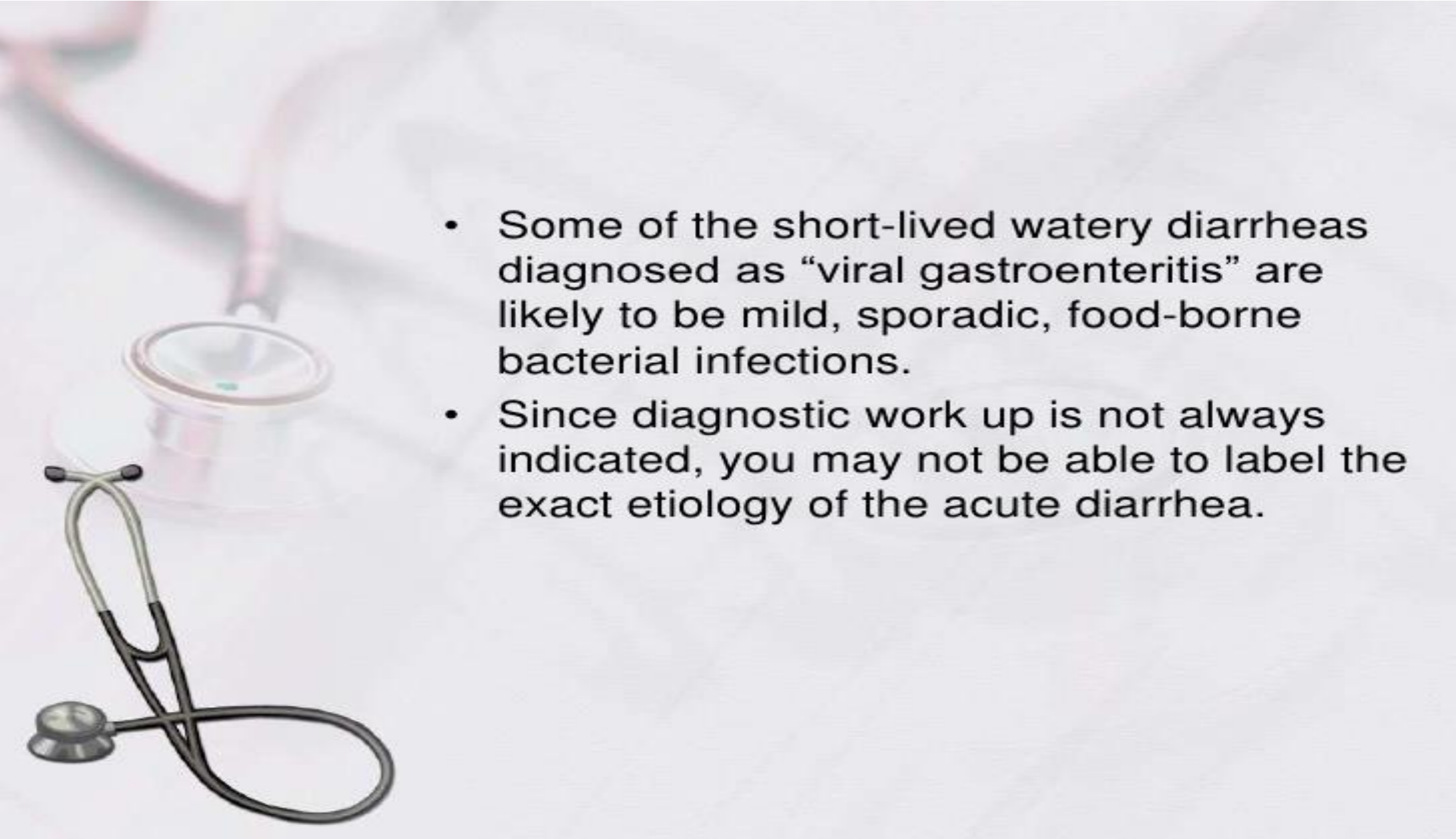
Chronic lasts more than 2 - 3 weeks

Signs and symptoms

- Frequent loose, watery stools
- Abdominal cramps
- Abdominal pain
- Fever
- Bleeding
- Lightheadedness or dizziness from dehydration

- Normal stool frequency ranges from three times a week to three times a day
- Acute diarrheas are those lasting less than 2 to 3 weeks or, rarely, 6 to 8 weeks.
  - The most common cause of acute diarrhea is infection. Learn infectious vs. non-infectious.
- Chronic diarrheas are those lasting at least 4 weeks, and more usually 6 to 8 weeks or longer.
  - There are three categories of chronic diarrhea:
    - osmotic (malabsorptive) diarrhea
    - secretory diarrhea,
    - and inflammatory vs. non-inflammatory diarrhea.

Acute infectious diarrhea

- Most infectious diarrheas are acquired through fecal-oral transmission from water, food, or person-to-person contact

- Patients with infectious diarrhea often complain of nausea, vomiting, and abdominal pain and have watery, malabsorptive, or bloody diarrhea and fever (dysentery)

- Some of the short-lived watery diarrheas diagnosed as "viral gastroenteritis" are likely to be mild, sporadic, food-borne bacterial infections.
- Since diagnostic work up is not always indicated, you may not be able to label the exact etiology of the acute diarrhea.

Acute Diarrhea

Bloody

- Must evaluate ALL bloody diarrhea.
- C & S stool
- Sigmoidoscopy
- Maybe CT

Non-bloody

- Most are viral
- Most resolve on own without definite dx
- Rarely further complications unless remission of a chronic condition
- If sx progress to fever, pus, dehydration, then needs more evaluation.

Big Clinical Clues to Infectious vs. Noninfectious

Infectious!

- Fever
- Pus
- Blood
- Epidemic
- Travel
  - Bacterial: Sx onset WHILE IN visited country
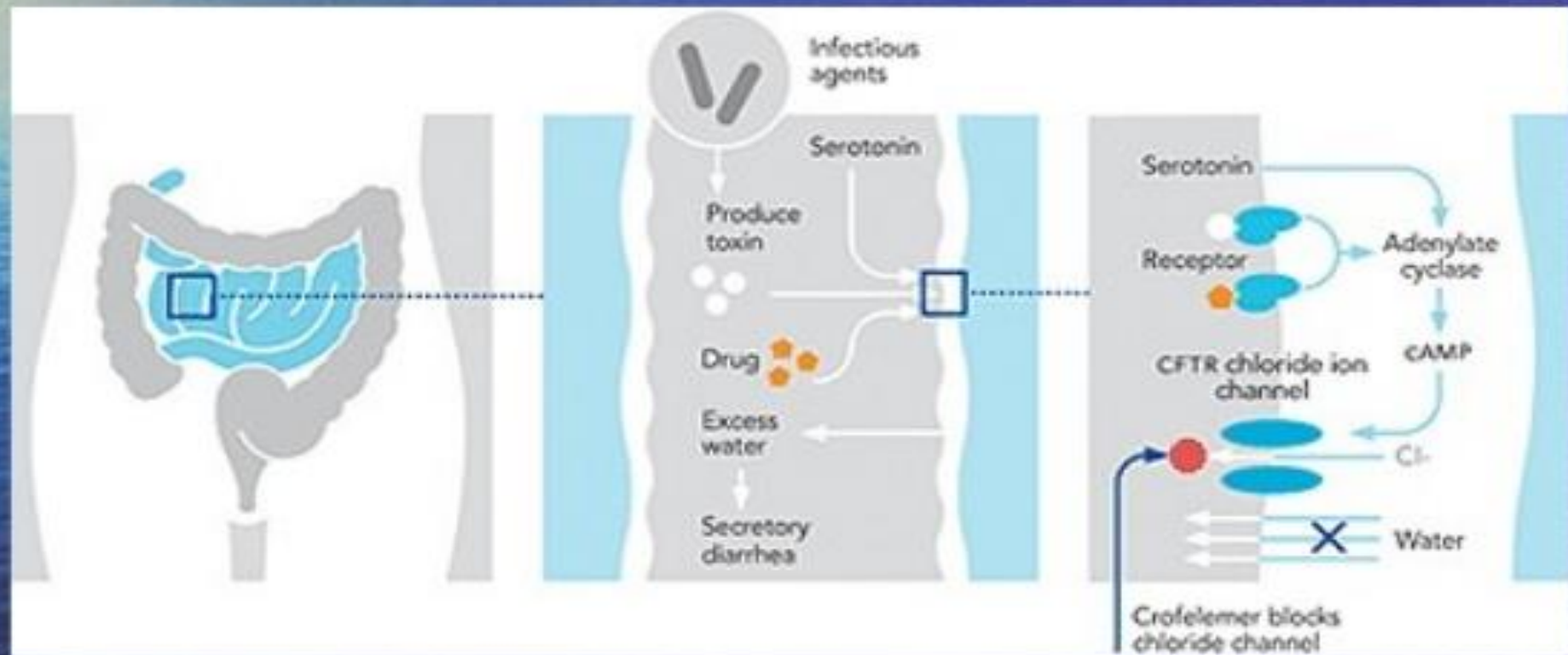 - Parasitic: Sx onset AFTER RETURN

Noninfectious

- AFEBRILE
- Non-pus stool
- Nonbloody
- Sporadic
- No travel

Types of diarrhea

- There are at least four types of diarrhea: secretory diarrhea, osmotic diarrhea, motility-related diarrhea, and inflammatory diarrhea.

Secretory diarrhea

Secretory diarrhea

- Secretory diarrhea means that there is an increase in the active secretion, or there is an inhibition of absorption. There is little to no structural damage. The most common cause of this type of diarrhea is a cholera toxin that stimulates the secretion of anions, especially chloride ions. Therefore, to maintain a charge balance in the lumen, sodium is carried with it, along with water.

Osmotic diarrhea

- too much water is drawn into the bowels. This can be the result of maldigestion (e.g., pancreatic disease), in which the nutrients are left in the lumen to pull in water.
- caused by osmotic laxatives (which work to alleviate constipation by drawing water into the bowels).
- In healthy individuals, too much magnesium or vitamin C or undigested lactose can produce osmotic diarrhea.
- A person who has lactose intolerance can have difficulty absorbing lactose after an extraordinarily high intake of dairy products.
- In persons who have fructose malabsorption, excess fructose intake can also cause diarrhea.
- Diarrhea stops when offending agent (e.g. milk, sorbitol) is stopped

Motility-related diarrhea

- Motility-related diarrhea is caused by the rapid movement of food through the intestines (hypermotility). If the food moves too quickly through the GI tract, there is not enough time for sufficient nutrients and water to be absorbed. This can be due to a vagotomy or diabetic neuropathy, or a complication of menstruation. Hyperthyroidism can produce hypermotility and lead to pseudodiarrhea and occasionally real diarrhea. Diarrhea can be treated with antimotility agents (such as loperamide).

Inflammatory diarrhea
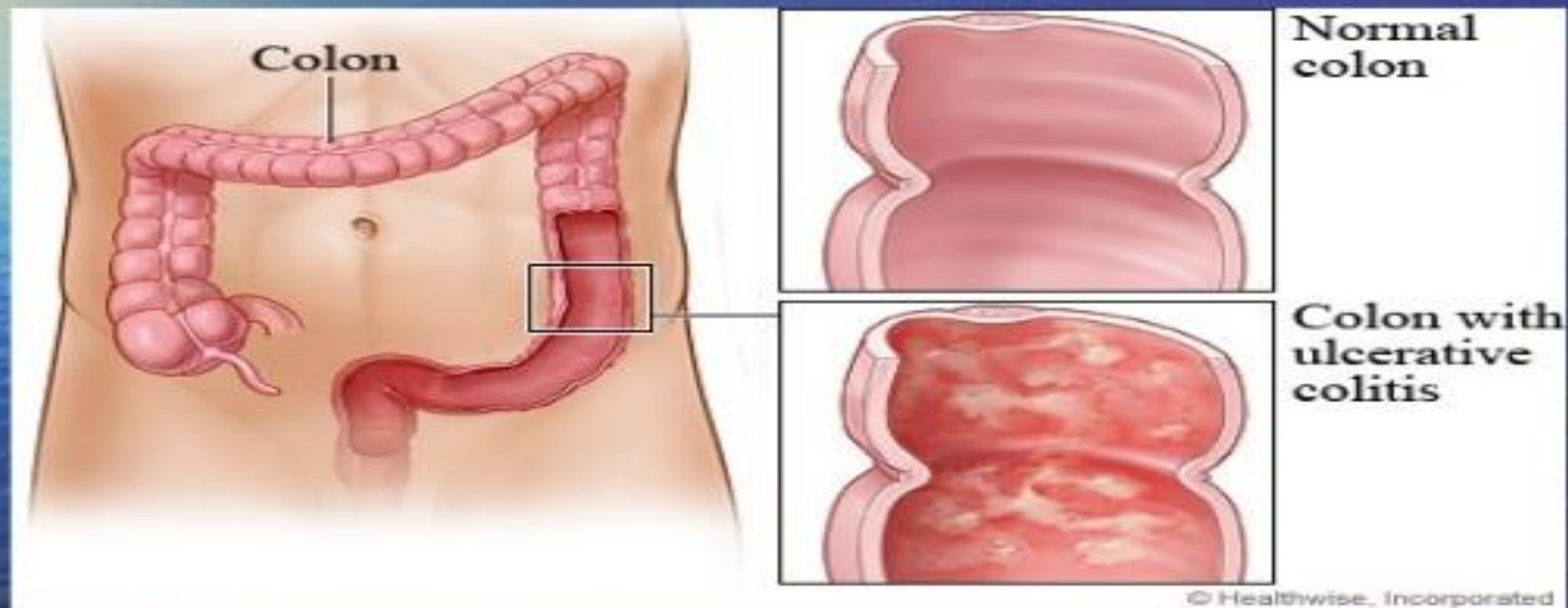
- occurs when there is damage to the mucosal lining, which leads to a passive loss of protein-rich fluids, and a decreased ability to absorb these lost fluids.

- caused by bacterial infections, viral infections, parasitic infections, or autoimmune problems.

- also be caused by tuberculosis, colon cancer, and enteritis

Infections
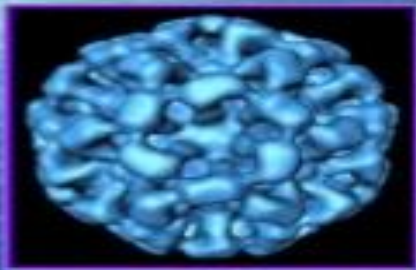
- Diarrhea is most commonly due to viral gastroenteritis with rotavirus accounting for 40% of cases in children under five
- In travelers however bacterial infections predominate.
- It can also be the part of the presentations of a number of medical conditions such as: Crohn's disease or mushroom poisoning.

Get a thorough history from your patient!

- Nutritional supplements should be reviewed, including
  - the intake of "sugar-free" foods (containing nonabsorbable carbohydrates),
  - fat substitutes,
  - milk products,
  - and shellfish,
  - and heavy intake of fruits, fruit juices,
  - or caffeine.

- **Questions to ask**

- A good history is crucial to gain a clinical picture of the patient's problem. Generally, the history should be directed to:

- ensure that the child is, in fact, experiencing an episode of diarrhea,

- **The following questions may be helpful.**

- When did the current problem start?

- ONSET: sudden, gradual

- Duration: days, week, Chronic?

- Frequency of stools:

- How many bowel movements per day?

-

- What is the normal pattern for this child?
-
- Are the loose movements interspersed by normal ones?

- Has the child ever experienced this before?

- What is the child's dietary history (rule out overfeeding)?

- What is the consistency of the stool?

- What is the volume of stool that the child is passing?

- Is there blood or pus contained within the stool?)? Bloody diarrhea may suggest specific infectious agents, inflammatory bowel disease, bowel ischemia (or necrotizing enterocolitis) or cow's milk protein allergy.

- Is it extremely foul-smelling or contain oil droplets (malabsorption)
- Abdominal cramps, peri umbilical, left lower?.
- Food taken; history of gastroenteritis in others sharing same food?.
- Allergy to some food?
- Water source?.
- History of weight loss?

- Is the child immunocompromised (if yes, think unusual infections)? Has the child been exposed to anyone else with a similar illness? Has the child been institutionalized? Has there been any travel or has the child newly immigrated? Has there been any recent use of antibiotics?
- Anxiety/ depression.

- Diarrhea is one of the most frequent adverse effects of prescription medications;
  - it is important to note that drug-related diarrhea usually occurs after a new drug is initiated or the dosage increased.
  - Especially antibiotics
    - Augmentin, EES

- Food- or waterborne outbreaks of diarrhea are becoming more common.
- The history should include
  - place of residence,
  - drinking water (treated city water or well water),
  - rural conditions,
  - with consumption of raw milk,
  - consumption of raw meat or fish
    - *Fish can become contaminated in their own environment (especially the filter-feeding bivalve mollusks, such as mussels, clams, oysters, and scallops) or by food handlers*,
  - and exposure to farm animals that may spread *Salmonella* or *Brucella organisms*
  - Unwashed vegetables
    - *outbreaks of E. coli O157:H7 have been associated with petting zoos and unwashed lettuce.*
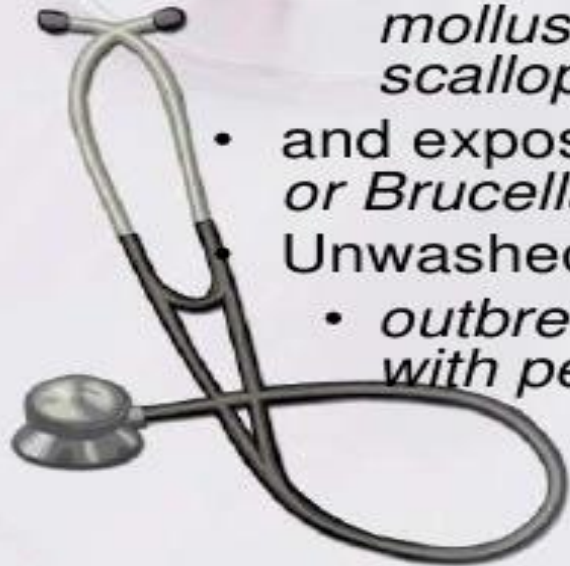
- Symptoms that begin within six hours suggest ingestion of a preformed toxin of Staphylococcus aureus or Bacillus cereus

- Symptoms that begin at 8 to 16 hours suggest infection with Clostridium perfringens

- Symptoms that begin at more than 16 hours can result from viral or bacterial infection (eg, contamination of food with enterotoxigenic or enterohemorrhagic E. coli).
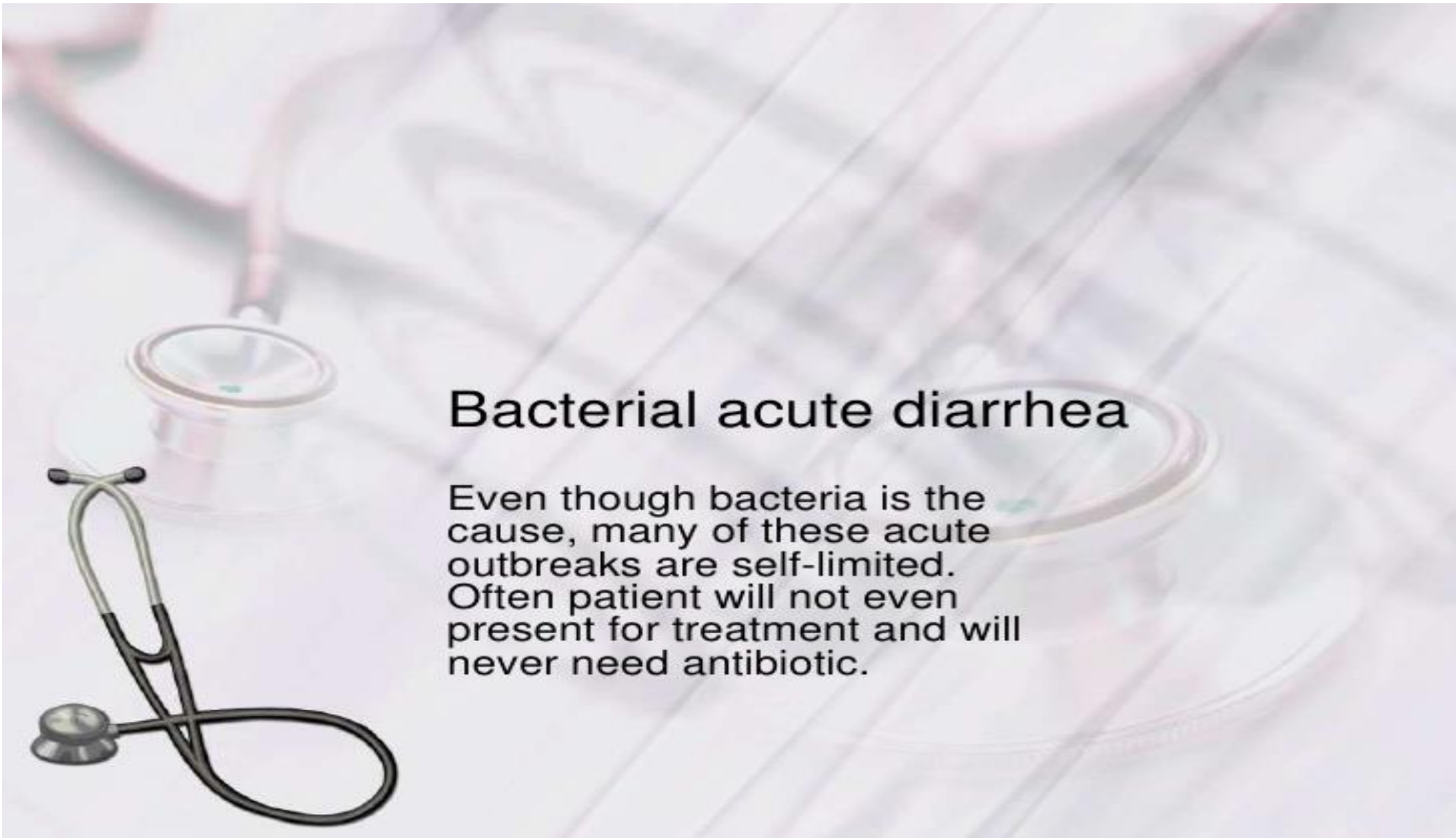
PE

- The physical examination in acute diarrhea is helpful in determining the severity of disease and hydration status.
- Vital signs (including temperature and orthostatic evaluation of pulse and blood pressure)
- and signs of volume depletion (including dry mucous membranes, decreased skin turgor, and confusion) should be carefully evaluated.
- A careful abdominal examination to evaluate for tenderness and distention
- and a stool examination to evaluate for grossly bloody stools are warranted. Nonbloody stools should be evaluated for heme positivity.

Viral acute diarrhea

- "Acute Viral Gastroenteritis"
- Sx onset
- Self-limited illnesses commonly due to
  - Norovirus
  - Rotovirus
  - Adenovirus
  - Astrovirus

Bacterial acute diarrhea

Even though bacteria is the cause, many of these acute outbreaks are self-limited. Often patient will not even present for treatment and will never need antibiotic.

Salmonella

- consuming food that is contaminated with animal feces
- 8-48 hours incubation
- Fever with chills
- Nausea and vomiting
- Cramping and abdominal pain
- Diarrhea often grossly bloody 3-5 days
- *Tx if not self-limited: Trimethoprim-sulfamethoxazole, ampicillin, ciprofloxin*

Noninfectious causes of diarrhea include

- inflammatory bowel disease,
- irritable bowel syndrome,
- ischemic bowel disease,
- partial small bowel obstruction,
- pelvic abscess in the rectosigmoid area,
- fecal impaction,
- and the ingestion of poorly absorbable sugars, such as lactulose and acute alcohol ingestion.

- A rotavirus vaccine has the potential to decrease rates of diarrhea.There are currently two licensed vaccines against rotavirus..
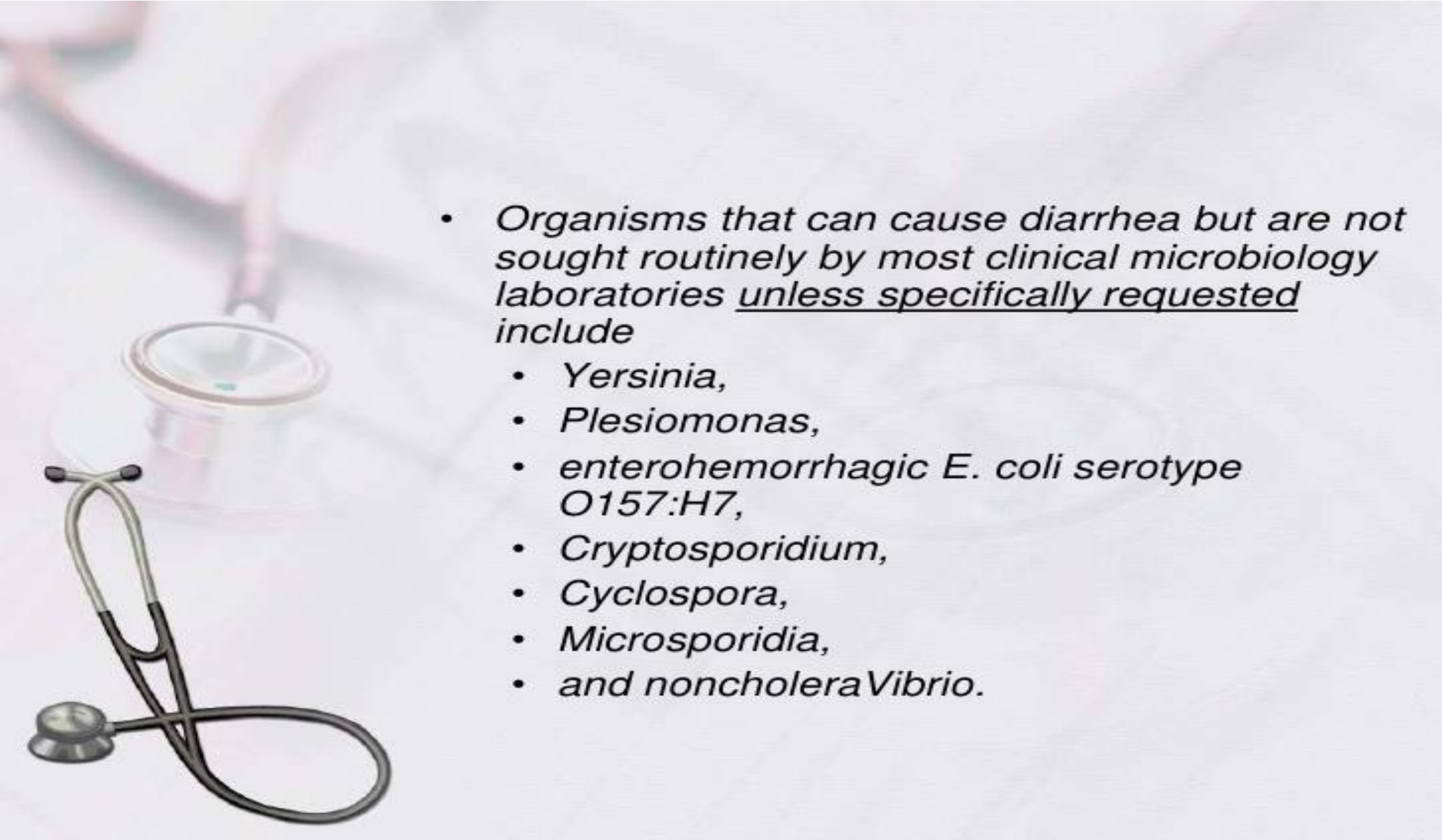
➢ On June 5, 2009, the (WHO) recommended that
- rotavirus vaccine be included in all national
- immunization programs
➢ Rotarix vaccine administered orally as a 2-dose series
➢ There should be an interval of at least 4 weeks between the
- first and second dose. The 2-dose series should be
- completed by 24 weeks of age
➢ For Rota Teq, the recommended schedule is 3 oral doses
- at ages 2,4 and 6 months. First dose should be
- administered between ages 6-12 weeks and subseqent doses
- at interval of 4-10 weeks.

Diagnostic evaluation of diarrhea

- The use of the laboratory to make the diagnosis of infectious diarrhea of *Campylobacter, Salmonella, Shigella,* and *C. difficile* and if only liquid stools are cultured.

- *"C & S" = culture and sensitivity of stool*

- *"C diff" = needs requested separately in local labs*

- Organisms that can cause diarrhea but are not sought routinely by most clinical microbiology laboratories *unless specifically requested* include
  - Yersinia,
  - Plesiomonas,
  - enterohemorrhagic E. coli serotype O157:H7,
  - Cryptosporidium,
  - Cyclospora,
  - Microsporidia,
  - and noncholeraVibrio.

TREATMENT

PREVENT OR TREAT DEHYDRATION

Give a child or adult plenty of clear fluid

Avoid milk or milk-based products, alcohol, apple juice, and caffeine

Give an infant frequent sips of water

If they are unable to keep up with their losses, call a doctor.

Tx

- The treatment of diarrhea can be symptomatic (fluid replacement and antidiarrheal agents) or specific (antimicrobial therapy) or both.

- Because death in acute diarrhea is caused by dehydration, the first task is to assess the degree of dehydration and replace fluid and electrolyte deficits.

- Severely dehydrated patients should be rehydrated with intravenous Ringer's lactate or saline solution, to which additional $K+$ and $NaHCO3-$ may be added as necessary.

- In mild-to-moderate dehydration, ORS (oral rehydration solution) can be given to infants and children in volumes of 50 to 100 mL/kg over 4 to 6 hours; adults may need to drink 1000 mL/hr.

Diet

- Total food abstinence is unnecessary and not recommended.
- Foods providing calories are necessary to facilitate renewal of enterocytes.
- Patients should be encouraged to take frequent feedings of fruit drinks, tea, "flat" carbonated beverages, and soft, easily digested foods such as bananas, applesauce, rice, potatoes, noodles, crackers, toast, and soups.

- Dairy products should be avoided, because transient lactase deficiency can be caused by enteric, viral, and bacterial infections.
- Caffeinated beverages and alcohol, which can enhance intestinal motility and secretions, should be avoided.

Who you must treat!

- Regardless of the cause of infectious diarrhea, patients should be treated if they are
  - immunosupressed;
  - have valvular, vascular, or orthopedic prostheses;
  - have congenital hemolytic anemias (especially if salmonellosis is involved);
  - or are extremely young or old.

- TABLE 1. Simplified 5-Step Approach to Diarrhea
- 1. Does the patient really have diarrhea? Beware of
- fecal incontinence and impaction.
- 2. Rule out medications as a cause of diarrhea
- (drug-induced diarrhea).
- 3. Distinguish acute from chronic diarrhea.
- 4. Categorize the diarrhea as inflammatory, fatty, or
- watery.
- 5. Consider factitious diarrhea.
- Are there any other concurrent problems or pertinent past medical history?